A deeper meaning of sustainability.
Insights from indigenous knowledge

Abstract

This paper argues that different cultures and their respective knowledge systems should partake to the sustainability debate. The focus is on insights that indigenous knowledge may provide, analyzing the principles which oversee indigenous relationship with nature, like reciprocity and caretaking. These principles move from a profound sense of unity and interconnectedness, and put emphasis on the importance of giving back to nature. They offer an alternative perspective on sustainability that challenges the Western view. Such a view is still focused on maintaining the possibility of exploitation, and embedded in a sense of separation from nature. The paper discusses the need of creating a laboratory for sustainability, i.e. a genuinely pluralist space in which multiple cultural expertise can interact and mutually enrich, yet maintaining their distinction and integrity. The main motivation of such an endevour should be to redefine the notion of sustainability in a more refined and thoughtful way: this is something vital for present and future generations.

Introduction

The paper contends that different cultures and their respective knowledge systems should contribute to the sustainability debate. The present-day environmental crisis urges us, in fact, to critically revise the overall scheme in which our societies are rooted, and in particular the very foundation of Western culture, since it plays a predominant role in planning the future. In order to gain insights on the matter, first the paper investigates the knowledge of indigenous people. It especially scrutinizes the principles, like reciprocity and caretaking, which oversee indigenous relationship with nature. These principles are driven by a sense of intimacy and interconnectedness, and draw attention to the importance of giving back to nature. For this reason, they challenge the Western idea of sustainability, whose focus is still centred on maintaining the possibility of exploitation, and which is embedded in a sense of detachment from nature. Next, the paper reflects about the need of creating a polycentric laboratory for sustainability, i.e. a place in which multiple cultural expertise and knowledge can establish meaningful relationships. Here indigenous people could play an important role. Their insightful principles and long-standing stewardship of the land put them in the position of being recognized, at the least in their qualified representatives, as highly refined experts in sustainability. Then, the paper discusses how such an engagement should lead us to redefine the notion of sustainability on a deeper basis. It also posits that different cultural systems like Western science and indigenous knowledge should not necessarily search for an ‘integration’. Rather, they should maintain their distinction and integrity, showing how the differences in their cultural frameworks and root assumptions are reflected in the possibility to achieve different scales of sustainability, and yet preserving the possibility of learning one from another.

Multiple cultural perspectives on sustainability

Sustainability is a multifaceted notion that reflects on interconnections and interactions across domains and scales, including the global and the local. It corresponds to the condition under which it is possible to uphold an *enduring well-being* of (human) communities and societies, by

meeting “the needs of the present generation without compromising the ability of future generations to meet their own needs” (WCED, 1987, p. 8).
In order to face the complex challenges of sustainability, it is not enough to search for new technological solutions and innovations (which are, of course, still needed and valuable), or to discuss environmental questions only at the policy level disregarding the *root* causes of the problem. In fact, there is a direct connection between the present-day environmental crisis and specific cultural categories and values. Then, it is important to focus also on the aforementioned categories and values, which basically pertain to the Western society, but such a task gets complicated by the fact that Western people are too involved in them. Even the concept of sustainable development is a product of Western thinking, and so are the ‘world machine’ metaphor, the dualistic notion of naturalness, and the linear-progressive view of time and history.
Currently, even in a number of international bodies and initiatives like the IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services) Conceptual Framework (Díaz et al., 2015), there is a growing awareness of the many different ways to perceive and portray the human–nature relationship, depending on the plurality of cultural settings, worldviews and moral codes. This also amounts to saying that multiple, even non-Western perspectives on sustainability exist in the world. Some of them express ancient traditions and ways of life. Rather than prejudge them as anachronistic, latest investigation is mainly oriented towards assessing whether these traditions have something to offer to the contemporary debate.

Indigenous knowledge
Consider, for example, the knowledge of indigenous people in various parts of the globe, as already mentioned in the Brundtland Report (WCED, 1987). [1] The West is now rediscovering this indigenous knowledge (IK) [2] (e.g. Mazzocchi, 2006; Mistry and Berardi, 2016; Turnhout et al., 2012), as a model for a healthy interaction with the natural environment, arisen from a long process of coevolution between indigenous people and their local surroundings (Colding and Folke, 1997).
IK embodies a wealth of wisdom and information gained over centuries from empirical observations, and transmitted over generations. It includes multiple environmental *practices*, which are linked to cultural norms and social protocols and contribute to shaping indigenous identity. By means of these practices, which were fully functioning especially before colonization, communities are able to soundly use the environment, and to respond and adapt to external changes, while at the same time maintaining resilience and the ability to evolve (e.g. Berkes, 1999; Gadgil et al., 1993).
An example are the Sahelian herding systems (Niamir-Fuller, 1998), which are practiced in a fringe environment where rainfalls are very variable and the scientific management systems perform badly. These systems encompass seasonal migrations, which are adapted to environmental unpredictability, for enabling the rotation of grazing lands and maintaining sustainability. The Sahelian herders follow simple rules-of-thumb for tracking environmental conditions, focusing on a few variables, like the length of grazing routes or the distance between grazed areas. Through flexibility in decisions making they are able to adapt to the highly variable environment of the semi-arid ecosystems. Other examples of widely diffused indigenous practices are illustrated in Table 1.

Table 1 – Examples of widely diffused indigenous *practices.*

Indigenous practice	Description
Shifting cultivation	An agricultural technique based on the rotation of cultivated plots of land, which is practiced for managing tropical forests in many regions of the world, e.g. Africa, South and Southeast Asia, the Amazon and New Guinea (Berkes, 1999). The plots are cultivated for a limited period of time, i.e. until the soil is impoverished or the area is infested by weeds, and then subsequently abandoned, moving on to another plot and allowing the natural vegetation to regenerate.
Rotation of hunting areas	As discussed in the case of Sahel migratory herding systems, the principle of rotation is applied not only in agriculture, but also in hunting and fishing, as practiced for example by the Chisasibi Cree (Quebec, Canada). Their system of regulating the goose hunt is based on rules, such as rotating weekly the hunting areas, and hunting territories, which are designed with the purpose of minimizing disturbance of animal populations (Berkes, 1982).
Traditional burning techniques	They are practiced in Asia, Australia, Africa and the Americas (Berkes, 1999). A notable example are Aboriginal methods of prescribed burning, which have been incorporated into National Park policy in particular areas of Australia (e.g. Lewis, 1989). These methods play a noteworthy role in preserving biodiversity. They allow both the perpetuation of fire-dependent plant species and, by creating buffer zones, the safeguard of fire-intolerant floristic communities. By avoiding the growth of shrubs and the afforestation of pastureland, they also contribute in preserving the quality of forage resources, and by avoiding the accumulation of highly combustible phytomass, they prevent potentially destructive fires.
Terrace farming	An ancient agricultural method, already practiced by the Incas (Graber, 2011) and even before by the Wari and other Andean people, which makes possible crop cultivation in hilly or mountainous areas. It involves the building of terraces or 'steps' onto the slopes of such areas. This practice helps to prevent that rain carries away soil nutrients and plants down the slope, allowing that they instead flow to the subsequent terrace. It also helps to decrease soil erosion and water loss, and favours the growth of crops that require irrigation. It is still widely diffused all over the world for farming rice, potatoes, maize, wheat, barley, and other types of crops.

IK is gaining a greater respect and interest in the world of environmental research and governance. Many now accept that it might provide valuable ecological insights – extending, for example, the spatial and temporal scales of observation of particular phenomena like changes in water levels and sea ice (e.g. Tengö et al., 2014) – and various attempts to use IK along with Western science have been done. In fact, indigenous methods are employed in several sectors such as climate change, as reported by the Intergovernmental Panel on Climate

Change (IPCC) Assessment Reports (Ford et al., 2016), and biodiversity preservation, as recognized in the Convention on Biological Diversity (CBD).
Various scientists and scholars come to recognize that IK may also contribute to the discussion on sustainability. What counts here is not so much the empirical usefulness of particular indigenous techniques, but rather the deeper levels of assumptions in which these techniques are grounded (Johnson et al., 2016; Tengö et al., 2014).

Taking care of nature: interdependence and reciprocity

Consider Descartes's distinction between psychic reality (*res cogitans*) and physical reality (*res extensa*), which is one of the most influential ideas of Western modernity. It superimposed a logic of disjunction on the structure of the universe, promoting the decline of the premodern, organismic worldview, in which nature was seen as nurturing (like a *mothe*r) and worthy of respect, and the rise of a mechanistic worldview, which instead split nature into inert bits of matter (e.g. Merchant, 1990). It also inspired the creation of various dichotomies, including the man-nature divide and the portrayal of nature as an 'external' reality. Nature came to be conceived as a mere object of exploitation and source of potential commodities, i.e. something to be controlled and transformed, with the aid of technology, for productive reasons (e.g. Haila, 2000). Today's preservationist theories, which conceive human action only as a potential disturbance factor and naturalness as necessarily linked to wilderness, still maintain or even reinforce such a dualistic view (e.g. Mazzocchi, 2016). Something similar happens with key ecological concepts like climax, which represents the dynamics of bioecological communities as a progressive realization of the climax community, i.e. the final and stable community of a series of development stages, whose achievement requires absence of perturbations, i.e. disturbing factors of natural or anthropogenic origin (Odum, 1983).
On the contrary, most indigenous cosmologies perceive everything in the universe as *interconnected* and *interdependent.* Nature and the human realm do not constitute separate domains, instead they are experienced with as sense a unity and mutual belonging. This human–nature relationship is usually depicted as symbiotic and based on *reciprocity*: from the natural environment indigenous people attain their subsistence and autonomy, at the same time contributing to its safeguarding.
It may be easier to understand this relationship by focusing on a specific feature, namely the relationship between plants (e.g. sweetgrass) and humans, as described by the Potawatomi (Native North American) scholar and botanist Kimmerer (2013):

> With a long, long history of cultural use, sweetgrass has apparently become dependent on humans to create "disturbance" that stimulates its compensatory growth. Humans participate in a symbiosis in which sweetgrass provides its fragrant blades to the people and people, by harvesting, create the conditions for sweetgrass to flourish (p. 164)

> Reciprocity is a matter of keeping the gift [from nature] in motion through self-perpetuating cycles of giving and receiving (…) Through reciprocity the gift is replenished. All of our flourishing is mutual (pp. 165-166).

Kimmerer makes it clear that reciprocity involves human active participation to the natural cycles. People should learn both how not to take too much – thus exceeding the plants' capacity "to share again" – and too little. It is in the balance point that resides the possibility to

achieve a sustainable harvesting, something which corresponds to "the way we treat a plant with respect, by respectfully receiving its gift" (p. 165). Of course, Kimmerer also recognizes that each plant has its own characteristics and way of regenerating, and that harvesting could be harmful for certain plants.

This sense of interrelatedness and reciprocity ("returning the gift") relies on the idea of a genealogical network, where nature is not perceived in terms of resources, but as full of 'relatives' (White et al., 2018); where no member of the network is allowed to dominate or is the only responsible for nature – even animals, plants, and physical elements like water or rocks are agents with responsibilities and potential owners of knowledge – and everyone has instead lessons to learn (Pierotti and Wildcat, 2000); where rights and responsibilities are balanced, the latter corresponding to a sense of stewardship (or caretaking, guardianship), which also has a reciprocal nature (White et al., 2016); and where even wealth is understood in terms of the number and quality of relationships one is able to maintain within the network (Wildcat, 2013).

Principles like interdependence, reciprocity and caretaking are common to many indigenous cultures from all around the world (see Table 2). They are simple but profound. If not taken as mere romantic ideals, these principles have the potential to heavily impact our way of conceiving the human–nature relationship. In several cases, indigenous experience across centuries showed that there is a link between the possibility to achieve an enduring well-being and the preservation of a sense of balance between man and nature. It also showed that, in order to carry out the expected outcomes, such a balance is not just something to seek because of convenience, but in view of a sense of respect and profound appreciation for nature. Here motivations behind action play, in fact, a key role (Pierotti and Wildcat, 2000).

Table 2 – Examples of indigenous *principles* from different geographical regions of the world as distilled in key notions and maxims.

Interconnectedness & Interdependence	Reciprocity & Caretaking	Region
The American Indian view of interconnectedness is conveyed by the Lakota phrase *Aho Mitakuye Oyasin* (which can be translated as "we are all related" or "all our relations"). The Nuuh-chah-nulth (Canada) express a similar meaning with *hishuk'ish tsawalk* ("everything is one"), while the Rarámuri (northern Mexico) use the term *iwigara* to indicate that all components of the cosmos are interwoven since they share the same breath or energy (Salmón, 2000).	The Anishinaabe notion of *mino-pimatisiwin* ("the good life") is about mutual reciprocity and beneficial exchange between everything and everyone. For the Nuuh-chah-nulth, the human bond with nature should be based on *uu-a-thluk* ("taking care of") and *iisaak* ("respect").	North America
In the Andean cosmology, every element has a vital energy and is immersed in a network of multiple relationships with all the others. Great emphasis is also put on the idea of complementarity. All things exist as inseparable opposites, which are seen, however, as complementary parts of a harmonious whole (the notion of	In Central and South America the notion of "buen vivir" (i.e. "living well") highlights the importance of living in equilibrium with nature, since all its components, and humans are just one among many, are interdependent and complement one another. This notion is expressed in several regional languages: as *laman laka* in	Central and South America

yanantin basically means "equilibrium through complementary opposites").	Miskitu, *suma qamaña* in Aymara, *sumak ñandereco* in Guaraní, and *sumak kawsay* in Qhichwa. In the Andean region, the multifaceted notion of *ayni* incorporates different aspects of reciprocity, which the local communities experience or practice	
The sense of kinship and interdependence is encapsulated in the Fijian maxims *ne qau vanua* ("the land which supports me and to which I belong") and *na vanua na tamatu* ("the people are the land"), in the Māori statement *Ko te awa ko au, ko au te awa* ("The river is me, and I am the river"), and in the Hawaiian phrase *I ola ʻoe, i ola iaʻu ne*i ("You live in me, and I live in you").	The Māori term *kaitiakitanga* means guardianship or stewardship (see also Box 1). It corresponds to a way of managing the environment rooted in the Māori worldview, according to which all things shares a common origin and a deep kinship exists between humankind and nature. An important goal of *kaitiakitanga* is not altering the *mauri* ("life force"*)* of a natural system beyond a given threshold. Similar notions are held by other Pacific island people. An example is the Hawaiian notion of *Malama Aina* ("to care for the land").	Oceania
In many African cosmologies, all things in the universe are seen as interrelated, mutually dependent and, in essence, as one. Such a view is expressed, for example, in the Shona language (Zimbabwe) by the term *ukama* ("relatedness") (Murove, 2007).	The importance of protecting the natural environment is encapsulated in several African sayings and proverbs. For example, the Chagga saying (Tanzania) *Oruka lu n'maseiyano* is about the need of treasuring the earth by being good stewards for it (Chuwa, 2014). The relationship of mutual nurturing between natural places and people is conveyed by the notion of "reciprocal service" (*kosalisana* in the Lingana language) (Peterson, 2000), and seems to be also captured by the Engenni proverb (Nigeria) "while the right hand washes the left, the left also washes the right".	Africa
According to the worldview of various indigenous groups in Asia (e.g. the Sng'oi of Malaysia and the Dayak of Borneo) and the Scandinavian Sámi, all parts of the cosmos are interlinked and humans are just one part of many. In the Sámi language the words for "earth" (*eanan*) and "mother" (*eadni*) derive from the same root (Kuokkanen, 2006).	The principle of "living well" is practiced by the Kankana-ey Igorot of Philippines, who express it as *gawis ay biag*. Human reciprocity with nature is also emphasized in many ways by the Sámi culture. For example, the notion of *birgejupmi* is linked to well-being and survival capacity, which require maintaining a balance between human society and the natural environment.	Asia and North Europe

Box 1 – An example of indigenous environmental management system: the Māori *Kaitaikitanga.*

Kaitaikitanga provides Māori with a complex and coherent framework which involves all aspects of environmental management, and is grounded on a system of beliefs, practices, and ethical values. As pointed out by Kahui and Richards (2014, p. 5): "The belief in a shared origin with all parts of the cosmos, as portrayed by *whakapapa*, link people and ecology through personified spirit ancestors, encouraging responsible stewardship. Resource exploitation focused on the importance of not altering the *mauri* of an ecosystem to an extent that it was unrecognizable: harvesting and resource access had to occur in a fashion that did not compromise the integrity of the system, and thus survival. Resource decisions were executed by chiefs, elders and resource specialists who were accountable to the wider kin group. The problems of mutual monitoring, enforcement and conflict-resolution were solved as part of a larger set of societal norms and ethics (…)". In Kahui and Richards' analysis, *Kaitaikitanga* manages ecological systems as 'commons', resembling the approach of modern 'adaptive management' as applied to social–ecological systems (see also Berkes et al., 2000).

Turning emphasis towards *giving*

Sustainability does not require cosmetic, superficial changes, but a radical shift:

> The magnitude of the crises we face, the speed with which they are unfolding (…) mean that the solutions we need to embrace are not going to be the same *sort of solutions* we're used to thinking of now (Steffen, 2008, emphasis in original).

If the issue lies especially on the conceptualizations of things, here the change should occur as well. Yet, the more fundamental the conceptualization, the stronger its implications and influencing power, the harder the challenge to call it truly into question.

Sustainability discourses aim to address key challenges that the whole world is facing. However, the Western frame of reference – which is one of the main causes of the environmental crisis – still exclusively settles what counts both as a problem and as a criterion for its solution.

Taking seriously IK's principles does not imply their uncritical acceptance, as if they were inherently good. Nor it involves searching for indigenous inputs just for making the Western approach a bit more decent, namely more holistic and receptive. It involves, instead, engaging seriously with the criticism to the common portrayal of sustainability that arises from IK's principles, and considering their potentially groundbreaking implications.

A simple example can help here: it is not about big questions, but rather attitude, from which motivations behind actions arise. It shows how even a seemingly tiny shift in attitude, from taking to *giving*, could have profound consequences.

The Western approach to sustainability searches for a balance between the social, economic and environmental requirements of present and future generations (Cutter, 2013). However, such an approach is mainly focused on human well-being and still based on a utilitarian attitude toward nature, which ultimately depends on its being embedded in a worldview of separation. It recognizes the need of a change of direction, but it does not really question leading concepts such as development and economic growth. The main concern is, in fact, that future generations still maintain the same possibilities to *exploit* the natural environment, even if such an exploitation needs a more proper regulation, owing to the intrinsic limits of environmental resources.

New models of development have also been suggested in the West, with the purpose of surpassing the North–South divide and the narrow view of development as only an economic process. For instance, Bensimon and Benatar (2006) introduced a new metaphor for 'developing sustainability', rather than 'sustaining development'. However, the overall framework remains essentially untouched.

At any rate, indigenous people see things differently. From an indigenous perspective, what is crucial is learning how to give back to nature. The issue is not that people should not take from the earth, as long as they are able to "respectfully receiving its gift". Yet, the indigenous overall scheme, which underlies any activity, emphasizes the existence of a natural cycle of giving and receiving, in which all things, man included, participate (Kimmerer, 2013).

One important way to express giving is fully embracing and rightly undertaking one's own duties and responsibilities. Indigenous people's main concern is, in fact, how to interact with nature properly, making sure that beneficial relationships are sustained over time, thus maintaining their quality and helping them to flourish. They believe that social and environmental deterioration occur precisely when one does not fulfill such responsibilities. As pointed out by the Anishinaabe (Native North American) scholar Deborah McGregor (2004b, p. 76),

> Indigenous people ask themselves what they can give to the environment and their relationship with it. The idea of sustaining, maintaining and enhancing relations with all of Creation is of utmost importance from an Indigenous point of view. (…) Indigenous people understand that with this special personal relationship with Creation comes tremendous responsibility; it is not something to be taken lightly. Creation is regarded as a gift. To be sustainable means to take responsibility and be spiritually connected to all of Creation, all of the time. Everyone and everything carries this responsibility and has duties to perform. All things contribute to the sustainability of Creation.

People's duties and responsibilities are observed by means of different types of practices and rituals, which can be mutually interlinked. For instance, environmental practices help the healthy functioning of ecosystems. As already mentioned, the flourishing of a plant like sweetgrass also depends on humans actions, i.e. *proper* harvesting. Indigenous sense of giving is translated here into specific deeds that nurture ecological relations and cycles.

Rituals and offerings, e.g. 'renewal' ceremonies, ritual incantations and the retelling of creation stories (Whyte et al., 2016), have, for their part, the purpose of reinforcing the sense of kinship with the universe. There is the conviction that such rituals have inherent power, and that by their means human beings are able to relate to cosmic forces, thus partaking in upholding the natural order (e.g. Kuokkanen, 2006). Here giving is about nurturing the linkage between different levels of reality, i.e. the biophysical and social world and the cosmic sphere. By constantly reenacting this linkage, even social or environmental practices come to be perceived as playing a role in the overall functioning.

At both levels, what is acknowledged is that giving is essential for completing the 'cycle'. Compared to the exploitative mind-set or 'mercantile' reciprocity, here there is, together with a change in action, a more crucial change in the motivations behind it. Such a focus on giving, which could be counted as an additional indigenous principle, contributes to creating an atmosphere of reciprocity that molds people's attitude.

Creating a polycentric space for sustainability

IK provides real lifestyle examples that naturally foster the condition of sustainability, and an alternative cultural framework for understanding the human-nature connection. The way we approach an unfamiliar system like IK is, however, crucial. We see things through our own cultural lens, basically projecting our concepts (i.e. developed in a specific tradition) on the cultural forms of another.

One key issue is that IK is not a mere 'thing' or 'body of knowledge' that one can *take up* from the sociocultural context in which it is embedded, letting non-indigenous people, e.g. Western scientists and agency workers, *use* it for the benefits of the West. [3]

This would amount to say that there are no particular problems for incorporating bits of IK, after some translation and interpretation, into the procedures of scientific research or global environmental governance, including those of the United Nations. However, such a way of proceeding would likely be "another form of colonialism (…) Indigenous knowledge is required to fit into the existing framework designed to fulfil the needs of Western ideals" (McGregor, 2004b, 74). One cannot expect from it much more than the 'assimilation' of IK into the dominant system (see also Mazzocchi, 2018a).

It would be better and more appropriate to create a *polycentric* laboratory of sustainability, i.e. a space for allowing a dynamic engagement across traditions. Such a space should not be built over one single centre (i.e. the Western point of view), which can never be really questioned and functions as the measure of everything else (e.g. IK), counting as periphery. Rather, there should be multiple centres, which are all regarded as having, in principle, equal possibility to know and be reliable, then also equal rights to speak. This is a crucial point because the possibility for indigenous people to be really influential is directly proportional to how much their credibility is recognized.

In such a laboratory, representatives of non-Western traditions should not figure as only 'informants'. Rather, they should play the role of actual co-producers of knowledge, being often the holders of alternative (even millennial) traditions. Besides, it should be possible to hear them *in their own* voices.

Of course, building such a space would require taking into account the existing power imbalance between the West and marginalized people, such as indigenous groups, and then facing problems of institutional design (Miller and Wyborn, 2018). Perhaps even more crucially, it would also require to address issues on the epistemic ground, as far as involving multiple, and potentially conflicting, interpretations of reality and knowledge criteria (e.g. Mazzocchi, 2018b). As Harding remarks (2015, pp. 105-6),

> How can we tell who is right when different cultures' knowledge claims conflict? And in these cases, it is just the claims themselves that conflict, or are different standards for objectivity, rationality, good methods, empirical reliability, even what constructs reality also at issue? Could be that Western standards for good science are just one of the many reasonable and desirable possible sets of such standards?

If Harding is right, one should then recognize that each tradition and knowledge is legitimate and credible in its own right, and does not necessarily require validation by some external (e.g. Western scientific) standards (Nadasdy 1999).

In view of that, one should also recognize that each tradition has developed, at many levels, specific abilities and specialties, and that each one has its own type of *expertise* (Wylie, 2015).

If this is the case, the aforementioned laboratory should then be envisioned as a place where multiple cultural expertise come to be involved and have the chance to enrich and complement each other, e.g. showing something that is beyond the others' reach.
Different cultural expertise can, in fact, involve different features, such as contrasting strategies of investigation or the ability to master distinct sets of natural relationships. For example, Western science aims to achieve an understanding of physical reality that enables, among other things, manipulative and predictive power. Instead, in indigenous settings what really matters is successfully mastering natural relationships that enable indigenous people, at least ideally, to live in agreement with their own principles, thus respectfully and harmoniously with the social and natural surroundings (Hester and Cheney, 2001).
Notably, indigenous expertise [4] does not only involve a knowing or acting. Rather, it arises at the intersection of a way of knowing and feeling, something that is then translated into an action (stewardship), and accomplished by embracing a system of responsibilities. Here the sense of kinship with nature and caretaking are, in fact, strictly interlinked: since indigenous peoples perceive their land as being a sustaining mother, what *spontaneously* arises out of this sense of deep intimacy is a care and concern for the land resembling the same they have for their families (e.g. Puhakka, 2014).
The uniqueness of indigenous expertise stems precisely from the fact that their disposition toward caretaking occurs spontaneously, i.e. without the need of further reasons. As a consequence, certain features of such an expertise cannot be reproduced in absence of the same experience of intimacy and no separation with nature. Conversely,

> (…) when separation is experienced, such a spontaneous action does not take place even when it may be held as a moral, ethical, or rational ideal (…) neither moral ideals nor rational arguments or scientific evidence have the power to persuade one to care for the other but there remains a fateful gap between how individuals, corporations, and governments may think they "should" act and how they, in fact, act with respect to nature (Puhakka, 2014, p. 11).

Therefore, indigenous expertise is a genuine, long-term, naturally occurring expertise of sustainability. Although indigenous specific practices and experiences directly apply to their local settings and in the context of traditional subsistence economies, the principles and attitude informing them have a much wider relevance.

"Separately but in parallel"
The laboratory of multiple cultural expertise should have ambitious purposes, i.e. forging new ways of thinking about sustainability. First and foremost, there is the need to redefine the notion of sustainability from a wider and more thoughtful point of view. What should be the final destination of such an endeavor? Perhaps, a new integrated framework of sustainability arising from the merging of Western (sustainability) science and IK?
Both systems enter the space of dialogue, having the common goal of creating a more sustainable world. Dialogue opens the possibility to share (understandings, methods, information, etc.). However, many challenges need to be faced, since different foundational beliefs, which ground in centuries of history, are involved in the process. Not only mutual incomprehension and misunderstandings are possible, but also deep disagreement or mutual exclusivity about key issues (e.g. speaking of gift vs. resources).

Of course, in the space of dialogue many interesting things could happen. Cultural systems may be transformed through interaction. Yet, differences should not necessarily be erased or 'resolved'. Following a polycentric approach does not mean searching to create a 'unified' scheme in which Western science and IK are merged or *integrated.* Rather, it is about establishing a genuinely pluralist framework, which allows the *coexistence* of distinct worldviews, knowledge and ways of life, creates pathways and let us moving across them.
A model like this has been described using the metaphor of the Two Row Wampum (Mc Gregor, 2004; Stevenson, 2006). The Two Row Wampum is a beaded belt symbolizing the mutual treaty agreement (also known as *Gusweñta*) made in 1613 between the Iroquois (or Haudenosaunee) people and representatives of the Dutch government. It consists of two rows of purple beads separated by rows of white beads: the former represent the respective vessels of the Haudenosaunee, i.e. a canoe, and the Dutch, i.e. a ship. These vessels are used to travel side-by-side down the 'river of existence', which is represented by the white beads.
The people from each vessel establish a relation of friendship, based on respect and the willingness to mutually support each other, whenever needed. However, the pathways of the two vessels remain separate, thus symbolizing that the sociocultural settings remain distinct and maintain their overall integrity.
As pointed out by McGregor (2004b, p. 87),

> The Two-Row Wampum serves as a model for renewing and reconciling a damaged relationship between two peoples (…) The principles of sharing and respect can apply to the intellectual tradition in the form of sharing knowledge.

Applying this model to our case, one could say that Western science and IK should go hand in hand – "separately but in parallel" (Berkes, 1999, p. 270) – keeping the possibility to learn from each other. The fact is that, on the subject of sustainability, it is the West that needs help from other cultures. The Western approach to sustainability, which still relies on sophisticated physical and conceptual knowledge, technological development, and quantitative tools, has led us to achieve only limited results so far.
IK may help us to identify both the actual level of the problem and possible solutions, providing a model for achieving *larger scale* sustainability. It could make more evident an important Western contradiction, i.e. looking for sustainability, and yet at the same time not really questioning the cultural scheme that caused the environmental crisis. One key indigenous lesson is that root assumptions and worldviews do matter (see also Berkes, 1999).

Redefining the notion of sustainability
As discussed through the paper, a critical reconsidering of the idea of sustainability should also involve the *root level,* i.e. ground assumptions that determine the way one culturally experiences and understands the world, and establish the 'mindscape' of a society. The issue is that such assumptions are so deeply engrained in one's culture that is not easy to be aware of their influencing power or their immanence in a specific socio-cultural context. In light of them, things can only appear in a specific way, with the result that other possible ways of perceiving and thinking are occluded.
Alternative systems like IK can play as 'decentering forces', helping to create a distance from the Western picture of reality and core tenets. What is most informative is precisely the

contrast between the two cultural frameworks taken in their entirety, because their differences are also reflected in the possibility to achieve different scales of sustainability (see Table 3).

Table 3 – The different conceptual frameworks of the dominant and indigenous views of sustainability.

	Dominant view of sustainability	Indigenous view of sustainability
Basic definition of sustainability	Enduring wellbeing of *human* societies and communities.	*Overall* enduring wellbeing.
Root assumptions	Dualistic worldview, as reflected in nature's objectification and the human-nature divide (emphasis on separation).	Interconnection and interdependence of all elements of the universe (emphasis on unity and relationality).
Human relationship with nature	Utilitarian attitude toward nature, essentially oriented toward a "regulated" exploitation.	Sense of respect, giving and reciprocity, as expressed in the idea of caretaking or guardianship.
Key notions and metaphors	Development; Resources; Commodities; Ecosystem services; Nature's benefits to people	Living well; Gifts; Relatives; Mother Earth.
Scale of sustainability	Lesser scale.	Higher scale.

The entire family of concepts and approaches revolving around the dominant conception of sustainability needs to be critically scrutinized, as it still grounds on the objectification of nature and on a one-way relationship between people and the environment. For example, nature as an object of exploitation, which is inherent not only in the logic of notions like 'resources' or 'commodities', but also in the most recent 'ecosystem services' (Daily et al., 1997) or 'nature's benefits to people' (e.g. Díaz et al., 2015); nature as an object of investigation (e.g. seeing a given natural item as only an experimental unit); and nature (i.e. the land) as an object of ownership. These are all respectable and yet very limiting notions, as they perpetuate our entanglement with the idea of being separated from nature.
The indigenous view and principles, which greatly contrast with the Western dualistic view and the idea of a mechanistic order, indicate a possible trajectory for enhancing sustainability and redefining it on a deeper basis. They could foster a radical change in the mindscape, according to which sustainability ideally requires:

- [Attitude of giving] Being focused not only on taking away from nature, even if in a regulated fashion. Rather, people should move from an attitude of giving back, being constantly involved in learning how to do it, especially through the human duties in preserving the 'gift';
- [Reciprocity and caretaking] Promoting a two-way relationship between people and nature. People should genuinely embrace, generation after generation, the responsibility of caring for the environment, willing to act as guardians or stewards;

- [Sense of interconnectedness and interdependence with nature] A way of approaching nature that emerges – maybe even spontaneously – from perceiving an intimate kinship between people and nature, and, more generally, the universe as a complex network of relationships, i.e. everything is interconnected and no element has real chance of existing by itself.

At a first sight, these may appear good but only abstract ideals, and until they remain as such they will be unable to change social behavior. However, by focusing once again on their implications, i.e. what would actually mean for the contemporary society to *embrace* their lessons, their potentially transformative character becomes clear.
In fact, it makes a big difference thinking of the world as made of 'relatives' or 'peers' rather than 'resources' or mere 'experimental units'; and so does the appreciation of nature as deserving respect, assuming that humans are (one of) their caretakers rather than the only owners or masters of the natural environment. By feeling they belong to earth and they are part of it, people would treat it and behave accordingly. It would not make sense anymore to conceive nature as existing only to provide utility to humankind. Rather than trying to dominate it or experiencing alienation, people would attempt to live in consonance with nature and the overall surrounding. Finally, it would be more easily recognized that nature plays an important role even in human well-being: environmental and social health are closely interlinked, i.e. if one changes, the other does as well.
Overall, the indigenous view may lead us to recognize that a prerequisite for a more sustainable world is rebuilding an ecosophic awareness (Maffesoli, 2017): gaining the ability to reconnect what has been broken and fragmented, i.e. the unified fabric of the world; recognizing that the functioning of the whole depends on the balanced intertwining of all its elements. [5]
If this is the case, sustainability should then be rethought as the condition under which it is possible to uphold an *overall* enduring well-being. And yet, even defining sustainability in a more limited sense, i.e. as linked to human development and well-being, it is clear that they too cannot endure unless they preserve the roots of overall flourishing.

Possible synergies with 'common asset trust'
Learning from indigenous principles may help contemporary societies to develop better policies and decision-making. This is, however, the time to move beyond mere aspirations. Therefore, it is crucial to identify (even normative) tools capable of addressing the urgency of environmental issues, tools that different societies may accept and embrace immediately. Establishing a polycentric space for sustainability would make even more sense if synergies were created with other initiatives, which have a similar concern – establishing mechanisms for better safeguarding the natural inheritance – and an approach that is at least partially reminiscent of what postulated above.
'Common asset trust' is one of such initiatives. It grounds on the assumption that certain assets, including natural items like the atmosphere, water or forests, should be considered as public goods to be held in trust – something that can be likely shared by all societies and cultures – and that their management should follow the logic of common property rights (Ostrom, 1990). As reported by Woods (2014), despite its recent developments, the trust approach is yet grounded in ancient principles (i.e. dating back, in Western society, to the Roman age). Technically, a trust is a type of ownership by which one manages property on behalf of given beneficiaries. Today's public trust doctrine is a powerful legal device for warranting that governments act as people's trustees, having the fiduciary responsibility to safeguard essential

natural assets on behalf of present and future generations. Besides, it establishes a framework for regulating the relationships between different sovereigns of the world. In fact, together with the duties that governments owe toward their own citizens, they also have duties toward the other governments about how to manage and preserve the common asset, as they all are co-trustees and co-tenants.

Indigenous communities can, of course, take part in the trust mechanism as co-trustees of shared natural systems. Besides, if allowed to give their own perspectives and ideas, they can contribute to establish specific targets or contents (e.g. criteria and measures) at various scales (see e.g. Barnes et al., 2008; http://claimthesky.org/). Perhaps, they may even suggest new ways for developing the trust approach, especially on the conceptual ground. In fact, it is true that, from a certain point of view, indigenous stewardship of the land can be regarded as a long-standing example of ecological fiduciary care. Yet, it is also true that there are important differences between the 'commons' and 'trust' principles, which are rooted on the Western conception of ownership, and the indigenous idea of caretaking, which is alien to possession.

The creation of a polycentric space and public trusts are, or would be, initiatives that, acting on behalf of the global society, could contribute to improve sustainability. By working together in synergy, thus combining a laboratory of ideas and cultural expertise with an awareness-raising activity and legal framework, they would have a greater influencing power. They may promote public pressure against shortsighted views and corporate interests, which hamper the progress toward such a pressing goal. They may also represent a model to combine ancient wisdom with contemporary findings, as both necessary to build a better future.

Notes

1."These communities are the repositories of vast accumulations of traditional knowledge and experience that link humanity with its ancient origins. Their disappearance is a loss for the larger society, which could learn a great deal from their traditional skills in sustainably managing very complex ecological systems" (WCED, 1987, pp. 114-115).

2. IK does not correspond to a unitary or homogenous system: except for some shared general features, it encompasses an array of distinct systems of knowledge, beliefs and practices. Apart from that, the notion of 'indigenous knowledge', which emphasizes its autochthonous character, or quasi-synonyms like 'traditional knowledge', 'local knowledge', 'native science' are not univocally understood or defined. Actually, behind the terminological questions, there are very important issues at stake like the very meaning of knowledge or science.

IK is used in contrast to Western science because many Western scholars believe that only the latter is able to meet particular standards and values – for instance, standards of rationality, explanatory and predictive power, technical precision – and that only in this case a system should be labeled as 'science'. For some of these scholars, IK only grounds in anecdotal observation, and is basically unsystematic and non-quantitative. Therefore, it has a very limited reliability (Howard and Widdowson, 1996). Others, instead, recognize that even 'non-scientific' accounts of reality could provide knowledge which is dependable in its own way (El-Hani et al., 2008). Nonetheless, since indigenous accounts appeal to the spiritual and sacred dimension, thus beyond a naturalistic view of reality, they are not entitled to be labeled as science.

Still other scholars, such as Agrawal (1995, p. 433), refuse a clear distinction between (Western) science and IK: "It makes much more sense (…) to talk about multiple domains and types of knowledges, with differing logics and epistemologies". Agrawal argues that using

terms like Western science and IK reinforces such a divide while obscuring essential commonalities. For example, the fact that any knowledge system, including Western science, is value-laden, and then never neutral; or the fact that Western science and IK are both the confluence of multiple systems with various derivations; or even the fact that both are essential ingredients of their respective societies: the flourishing of any society depends, in fact, on having access on reliable, usable knowledge.

3. Actually, most Western scholars conceives IK exclusively as a body or store of knowledge, which has been gathered across generations (e.g. Nakashima et al., 2012). Such a tendency is contrasted by indigenous scholars themselves, who have repeatedly argued about its inadequacy. They contend that IK is not merely a knowledge (as usually intended), e.g. an *understanding* about how to live or something to study. Rather, it is also their very *way of living*, i.e. something that one performs also embracing a system of responsibilities. Therefore, it cannot be easily detached from the people who practice it (Pierotti and Wildcat, 2000).

4. Such an expertise can, of course, take various forms. Just one example are the Māori *kaitiaki* or guardians, which include elders, chiefs and ritual specialists (Kahui and Richards, 2014).

5. Focusing on principles like these may also lead to rediscover and revitalize an analogous ecosophic awareness in the Western tradition. A view based on intimate kin with nature and stewardship is, in fact, not limited to indigenous communities, but it has been and is somehow still practiced by other people around the world, such as rural communities. Historically, it is also present in the view, among others, of Francis of Assisi. His *Laudes Creaturarum* talks about "Brother Fire" and "Sister Water", and describes even animals as brothers and sisters to humankind. The second encyclical of Pope Francis, i.e. *Laudato si*, which has the subtitle "on care for our common home", is directly inspired by Francis's view.

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